

**FACT SHEET FOR NPDES PERMIT WA-000093-1
KAISER ALUMINUM & CHEMICAL CORPORATION
TACOMA WORKS**

TABLE OF CONTENTS

INTRODUCTION	1
BACKGROUND INFORMATION	2
DESCRIPTION OF THE FACILITY	2
History	2
Industrial Process	2
Discharge Outfall 001	2
Discharge Outfall 003	3
Discharge Outfall 004	3
Discharge Outfall 005	3
PERMIT STATUS	3
SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT	5
WASTEWATER CHARACTERIZATION	6
SEPA COMPLIANCE	7
PROPOSED PERMIT LIMITATIONS	7
DESIGN CRITERIA	8
TECHNOLOGY-BASED EFFLUENT LIMITATIONS	8
SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS	8
Numerical Criteria for the Protection of Aquatic Life	9
Numerical Criteria for the Protection of Human Health	9
Narrative Criteria	9
Critical Conditions	9
Mixing Zones	10
Description of the Receiving Water	10
Surface Water Quality Criteria	10
Consideration of Surface WQ-Based Limits for Numeric Criteria	11
Whole Effluent Toxicity	13
Human Health	15
Sediment Quality	16
GROUND WATER QUALITY LIMITATIONS	16
COMPARISON OF PROPOSED EFFLUENT LIMITS WITH THE EXISTING PERMIT	16
MONITORING REQUIREMENTS	17
LAB ACCREDITATION	18
OTHER PERMIT CONDITIONS	18
COMPLIANCE SCHEDULE	18
REPORTING AND RECORDKEEPING	18
SPILL PLAN	18
OUTFALL EVALUATION	19
TREATMENT SYSTEM OPERATING PLAN	19
GENERAL CONDITIONS	19

FACT SHEET FOR NPDES PERMIT WA-000093-1

PERMIT ISSUANCE PROCEDURES	20
PERMIT MODIFICATIONS	20
RECOMMENDATION FOR PERMIT ISSUANCE	20
REFERENCES FOR TEXT AND APPENDICES.....	21
APPENDIX A--PUBLIC INVOLVEMENT INFORMATION.....	22
APPENDIX B--GLOSSARY	23
APPENDIX C--TECHNICAL CALCULATIONS	26
APPENDIX D--RESPONSE TO COMMENTS	27

INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES) of permits, which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified by that review have been corrected before going to public notice. After the public comment period, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit are summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	Kaiser Aluminum & Chemical Corporation
Facility Name and Address	Tacoma Works 3400 Taylor Way Tacoma, Washington 98421
Type of Facility:	Primary Production of Aluminum (SIC Code: 3334) Aluminum Rolling and Drawing (SIC Code: 3355)
Discharge Locations	Underground Pipelines to Hylebos and Blair Waterways Outfall 001: Lat. 47° 15' 46" N Long. 122°22' 12" W (Hylebos) Outfall 003: Lat. 47° 15' 37" N Long. 122°21' 56" W (Hylebos) Outfall 004: Lat. 47° 15' 33" N Long. 122°21' 50" W (Hylebos) Outfall 005: Lat. 47° 15' 30" N Long. 122°22' 24" W (Blair)
Water Body ID No.	WA - 10 - 0020

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

Kaiser's Tacoma smelter was built in the early days of World War II by the federal government. It consisted of two potlines of horizontal stud Soderberg cells with an annual capacity of 20,000 tons. The Olin Corporation operated the smelter from 1942 until late 1945. The smelter was then inactive until Kaiser Aluminum & Chemical Corporation (Kaiser) purchased the plant in 1947.

Capacity increased in 1953 and 1968. The facility now has three potlines with a total of 400 horizontal stud Soderberg reduction cells. At full production of approximately 83,000 tons of aluminum per year (227 tons per day), the facility employs approximately 370 people. In September of 1998, Kaiser shut down Line 1 potline, and is currently operating 280 pots, which produces about 157 tons of aluminum per day.

INDUSTRIAL PROCESS

The Tacoma Works produces primary aluminum metal by the Hall-Heroult reduction process. This process requires the electrolytic decomposition of the raw material, alumina- aluminum oxide- into two chemical components- elemental metallic aluminum and gaseous oxygen. To do this, alumina must be dissolved into a liquid to allow direct current to pass through it. The process uses a fluorinated compound of sodium and aluminum cryolite, which melts around 1000° C and has the capability, in the molten state, to hold up to about 8% alumina in solution. Molten aluminum, which is released during the electrolysis, has a slightly higher specific gravity than molten cryolite at the cell operating temperature, and therefore will settle to the bottom.

The electrolytic cell (cathode) consists of a steel shell lined with insulating materials. The cathodes have an electrically conductive bottom made of carbon connected to the negative polarity of the power source. Hanging above and dipping into the cryolite-alumina melt are carbon anodes connected to the positive polarity. When the electric current flows from the anode to the cathode, alumina splits into metallic aluminum that spreads over the cell bottom. The released oxygen molecule rises to the bottom surface of the carbon anode where it burns and released as a blend of carbon dioxide and carbon monoxide gases. Fluoride also evolves from the bath due to the operating temperatures of the cells.

The permittee's primary water supply is on-site wells, although the smelter has city water available. All sanitary wastewater discharges to the City of Tacoma's sanitary sewer system.

DISCHARGE OUTFALL 001

The sources of 001 discharge water are non-contact cooling water and stormwater runoff. Non-contact cooling water is generated at the rod mill and Line 4 air compressors (~0.42 MGD). Contact and contaminated water comes from maintenance facilities. Stormwater makes up the remainder of flow to Outfall 001, and varies significantly in flowrate and concentration. Major pollutants include total suspended solids, aluminum, and fluoride. Other monitored pollutants are free cyanide, benzo(a)pyrene, and oil and grease.

This treated process & stormwater effluent is discharged in the upper part of the Hylebos Waterway approximately 50 feet off shore and 9.5 feet below MLLW. The outfall terminates with a diffuser section consisting of two 10-inch horizontal nozzles oriented 180 degrees from each other and perpendicular to the outfall pipe. Total discharge volume from the permittee is continuous. Outfall 001 has a typical flowrate of 0.4 to 1.0 million gallons per day (MGD), and occasionally exceeds 2 MGD when major rainstorms occur.

DISCHARGE OUTFALL 003

Outfall 003 carries strictly stormwater runoff from 4.6 acres of Kaiser property. Upon leaving Kaiser property, this outfall enters a City of Tacoma stormwater drainage ditch along Taylor Way, and enters the Hylebos Waterway via the historical "Kaiser ditch," slightly upstream of outfall 001. Major pollutants are listed in Table 5. This discharge was monitored during the current permit term but had no limits. Discharge flow rates have not been determined.

DISCHARGE OUTFALL 004

Outfall 004 carries strictly stormwater runoff from 10.6 acres of Kaiser property. Upon leaving Kaiser property, this outfall flows behind Kaiser's rod mill, then south to a BPA road, and east to Hylebos Creek. Major pollutants are listed in Table 6. This discharge was monitored during the current permit term but had no limits. Discharge flow rates have not been determined.

DISCHARGE OUTFALL 005

This outfall consists of non-contact cooling water from air compressors and rectifiers, averages around 0.6 MGD, and discharges into the Blair Waterway. Major pollutants are listed in Table 7. This discharge was monitored during the current permit term but had no limits. Discharge flow rate was measured once.

PERMIT STATUS

The current permit for this facility was issued March 23, 1990 and modified February 14, 1992. Kaiser submitted an application for permit renewal to the Department on March 23, 1994. The Department notified Kaiser that the renewal application was received and was timely and sufficient on August 20, 1996.

The current permit places effluent limitations on Outfall 001 for total suspended solids (TSS), fluoride, Aluminum, Free Cyanide, Benzo(a)Pyrene (B(a)P), Oil & Grease, pH, Total PCBs, and Nickel. The limits and monitoring requirements for all outfalls are as follows:

Table 1: Effluent limitations & monitoring requirements: *Outfall 001*

Parameter	Units	Average Monthly	Maximum Daily	Monitoring Frequency	Sample Type
Total Suspended Solids	lb/day	160.0	320.0	Daily	24 hr comp
Fluoride	lb/day	80.0	240.0	Daily	24 hr comp
Aluminum	lb/day	25.0	50.0	Daily	24 hr comp
Cyanide, free	mg/L	-	0.01	Weekly	24 hr comp
Benzo(a)Pyrene	mg/L	-	0.01	Weekly	24 hr comp
Oil and Grease	mg/L	-	10	Daily	Grab
PCB's	mg/L	-	0.003	Quarterly	Grab
Nickel	mg/L	-	0.01	Weekly	24 hr comp
Copper	-	-	-	Weekly	24 hr comp
pH		Min. 6.0	Max. 9.0	Continuous	Continuous
Temperature	°F	-	-	Continuous	Continuous
Flow	MGD	-	-	Continuous	Continuous
Precipitation	Inches	-	-	Daily	24 hr. Sample
Production:		-	-	Daily	Monthly Avg.
Aluminum metal	tons/day	-	-	-	Daily Average

Note: The current permit contains operable definitions not shown in this table.

Table 2: Effluent monitoring requirements: *Outfalls 003 and 004*

Parameter	Monitoring Frequency	Sample Type
Total Suspended Solids	***	Grab
Fluoride	***	Grab
Aluminum	***	Grab
Cyanide, free	***	Grab
Benzo(a)Pyrene	***	Grab
Oil and Grease	***	Grab

***- Three samples each month during October through March. One sample each month during April through September, if possible, with storm event flows.

Table 3: Effluent monitoring requirements: *Outfall 005*

Parameter	Monitoring Frequency	Sample Type
Total Suspended Solids	Monthly	Grab
Fluoride	Monthly	Grab
Aluminum	Monthly	Grab
Oil and Grease	Monthly	Grab

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

The last water inspection was an unannounced Class II inspection conducted on May 3, 1999. The facility complied with the permit limits and conditions at the time of the inspection.

During the history of the previous permit, the Permittee has complied with most NPDES permit requirements, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department. Noncompliance events for 1995, 1996, 1997, and 1998 were reported as follows:

1995: Incomplete flow data for six days in February, November, and December. A pH of greater than 9 at Outfall 001 was recorded during ten days in April, sixteen days in May, twenty-six days in June, seven days in July, and one day in September.

1996: Incomplete flow data was reported for six days in both January and February, five days in April, three days in November, and fourteen days in December. A pH of greater than 9 at outfall 001 was recorded for thirty days in July and three days in August. Also, one composite sample at outfall 001 was not collected in May.

1997: Incomplete flow data was reported for six days in January, four days in March, one day in June, three days in October, one day in November, and two days in December. Samples were not collected at outfall 001 for 12 days in January due to sampler pump failure, and one day in May (penalty No. DE 97WQ-I056). In April, two cyanide samples were not collected at outfall 001 due to operator error. In June on B(a)P sample was lost due to lab error. A pH greater than 9 at outfall 001 was recorded for six days in June, 20 days in July, 12 days in August, and two days in September.

1998: Incomplete flow data for nine days in January. In January, had 15 daily and one monthly average violation of TSS at outfall 001- Penalty No. DE 98WQ-I023. Daily and monthly average exceedances of fluoride and aluminum in November, caused by excessive stormwater. A pH greater than 9 at outfall 001 was recorded for 2 days in July and fifteen days in August.

In 1999, the Department discovered that Kaiser failed to meet about forty sample collection requirements over the life of the current permit.

WASTEWATER CHARACTERIZATION

Major pollutants of concern for Outfall 001 are shown in Table 4; Outfall 003 in Table 5; Outfall 004 in Table 6, and Outfall 005 in Table 7. Characterization of Outfalls 003, 004, and 005 include information from Kaiser's renewal application, monitoring results during the current permit term, and Ecology inspections.

Table 4: Wastewater Characterization of Outfall 001

Parameter	Max. Daily Value	Long Term Avg.
Flow	1.71 MGD	0.58 MGD
TSS	796 lb/day / 56 mg/L	40 lb/day / 8 mg/L
Fluoride	197 lb/day / 22 mg/L	28 lb/day / 5.5 mg/L
Aluminum	34.2 lb/day / 5 mg/L	3.6 lb/day / 0.7 mg/L
Oil & Greases	29.5 lb/day / 5 mg/L	1.9 lb/day / 0.4 mg/L
Free Cyanide	0.11 lb/day	<0.005 mg/L
Benzo(a)pyrene	0.0085 lb/day	<0.001 mg/L
Total PCB's	0.0005 lb/day	<0.0001 mg/L
Total Copper	0.66 lb/day / 0.05 mg/L	
Total Arsenic	<0.10 mg/L	
Total Antimony	<0.06 mg/L	
Total Cadmium	<0.005 mg/L	
Total Nickel	0.43 lb/day / 0.03 mg/L	
Total Zinc	0.3 lb/day / 0.02 mg/L	

Table 5: Wastewater Characterization of Outfall 003

Parameter	Max. Daily Value	Long Term Avg.
Flow	0.63 MGD	-
TSS	783 lb/day / 150 mg/L	20 mg/L
Fluoride	762 lb/day / 145 mg/L	50 mg/L
Aluminum	100 lb/day / 19 mg/L	2.7 mg/L
Oil & Greases	9.5 lb/day / 2 mg/L	0.7 mg/L
Cyanide, total	4.3 lb/day / 0.82 mg/L	-
Benzo(a)pyrene	0.08 lb/day / 0.015 mg/L	-
PCB-1248	0.007 lb/day / 0.0014 mg/L	-
Total Copper	0.6 lb/day / 0.011 mg/L	-
1,1,1 Trichloroethane	0.11 lb/day / 0.02 mg/L	-
Total Nickel	0.05 lb/day / 0.01 mg/L	-
Chlorine, total	0.32 lb/day / 0.06 mg/L	-
Total Zinc	0.4 lb/day / 0.072 mg/L	-

Table 6: Wastewater Characterization of Outfall 004

Parameter	Max. Daily Value	Long Term Avg.
Flow	1.01 MGD	-
TSS	393 lb/day / 47 mg/L	13 mg/L
Fluoride	52 lb/day / 6.2 mg/L	5.0 mg/L
Aluminum	20 lb/day / 2.4 mg/L	1.02 mg/L
Oil & Greases	88 lb/day / 11 mg/L	3.7 mg/L
Chlorine, total	0.17 lb/day / 0.02 mg/L	-

Table 7: Wastewater Characterization of Outfall 005

Parameter	Max. Daily Value	Long Term Avg.
Flow	0.59 MGD	-
TSS	41 lb/day / 8.4 mg/L	2.7 mg/L
Fluoride	4.9 lb/day / 1 mg/L	0.56 mg/L
Aluminum	0.84 lb/day / 0.17 mg/L	0.11 mg/L
Oil & Greases	0.98 lb/day / 0.2 mg/L	0.08 mg/L
Free Cyanide	0.11 lb/day	<0.005 mg/L

SEPA COMPLIANCE

This permit renewal has no SEPA compliance issues.

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations are based upon the treatment methods available to treat specific pollutants. Technology-based limitations are set by regulation or developed on a case-by-case basis (40 CFR 125.3, and Chapter 173-220 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992). The more stringent of these two limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis and the limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, and they don't have a reasonable potential to cause a water quality violation. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology.

The current permit required several studies over the life of the permit. These studies included stormwater runoff, discharge reduction/elimination, treatment system detention time, and mixing zone dilution ratios. The results of these studies raised questions about the adequacy of Kaiser's treatment system, including detention time and treatment efficiency of the treatment ponds for Outfall 001, and the pollutant loadings of outfalls 003 and 004. Because of these concerns, Ecology directed Kaiser to study their system with regard to AKART, via regulatory order No. DE 99WQ-I016. Kaiser will remedy any inadequacies identified by the AKART study. Upon completion of system upgrades, if any, Ecology may re-evaluate permit limits at that time.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria. Little design information about the 1983 settling basin is available. If a new or updated treatment system is required as a result of the AKART study, then design criteria will exist for the new/modified treatment system. (see previous section).

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Federal effluent guidelines exist for aluminum smelters, but Kaiser does not contain any of the discharge "building blocks". Therefore, proposed limits for TSS, fluoride, and aluminum are based on demonstrated performance, and are therefore considered to be technology-based effluent limits under AKART. Kaiser's wastewater discharges were first characterized for the period January 1, 1993 through December 31, 1996 for the regulated parameters listed in the following data tables. Specifically, data for calendar years 1993 through 1996 were statistically analyzed at the 99 and 95 percent confidence levels to derive daily maximum and monthly average limits, respectively.

Upon the facility's factual review of the draft permit, Kaiser submitted comments. Among these were the fact that during part of this timeframe, January 1993 through November 1995, one potline was shut down. A portion of the pollutants treated and discharged in Kaiser's outfall are linked to production rates. Specifically, fallout of air emissions from production of aluminum and small spills and lost raw materials all contribute to suspended solids in Kaiser's wastewater discharge. Therefore, Ecology agreed that the 1993-96 time period was not fully representative, due to curtailed production. Ecology then re-evaluated potential limits by the same methodology using the calendar years 1996 and 1997, when the smelter was operating at full capacity. These limits are now proposed in the public notice draft version.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Surface water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The U.S. EPA has promulgated 91 numeric water quality criteria for the protection of human health that are applicable to Washington State (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

ANTIDEGRADATION

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC. Therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

MIXING ZONES

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100. However, the Department will allow Kaiser's mixing zone as long as the conditions of Kaiser's AKART order are met, as per regulatory requirements.

Kaiser completed their mixing zone study during the course of the current permit cycle. Ecology reviewed the study and approved acute (9:1) and chronic (22:1) dilution factors. The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

DESCRIPTION OF THE RECEIVING WATER

The facility discharges to the Hylebos and Blair Waterways of Commencement Bay, which are designated as Class B marine estuarine receiving water in the vicinity of the outfalls. Characteristic uses include the following:

Class B (good): water supply (industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; secondary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation. Water quality of this class shall meet or exceed the requirements for most uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	5 mg/L minimum
Temperature	19°C. maximum or incremental increases above background
pH	7.0 to 8.5 standard units
Turbidity	less than 10 NTU above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls that the Department has determined to be AKART. A mixing zone for Outfall 001 is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC. The Outfall 001 mixing zone is defined as follows:

Chronic Mixing Zone: The length of the chronic mixing zone shall extend upstream and downstream of the discharge ports for two hundred and ten feet (210) in both directions. The width of the chronic mixing zone shall be 62.5 feet on each side of the diffuser. The dilution ratio at the edge of this chronic zone has been calculated to be 22 to 1 (22:1).

Acute Mixing Zone: The acute mixing zone is ten percent (10%) of the chronic mixing zone as previously defined. This zone shall be twenty-one (21) feet longitudinally and 6.25 feet laterally from the outfall. The dilution ratio for the acute zone has been calculated to be 9 to 1 (9:1).

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of fluorescent dye study and UMERGE computer model (Parametrix, Inc., 1993). The dilution factors have been determined to be:

	Acute	Chronic
Aquatic Life	9	22
Human Health, carcinogenic	NA	22
Human Health, non-carcinogenic	NA	22

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect. The derivation of surface water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The critical condition for the Hylebos Waterway is during Mean Lower Low Water, with minimal tidal exchanges and maximum density stratification (Parametrix, Inc. 1993). The impacts of temperature, pH, metals, and other toxics were determined as shown below, using the dilution factors at critical conditions described above.

Temperature--Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, no effluent limitation for temperature is placed in the proposed permit based upon the Department's best professional judgment.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the Water Quality Standards for Surface Waters. In response to periodic high effluent pH values due to seasonal algal activity, Kaiser installed a pH meter at the influent to the lagoon treatment system. This information has confirmed the occurrence of seasonal, occasional high effluent pH values that are not due to influent pH, but occur due to algal activity. Due to the high buffering capacity of marine water and a chronic mixing zone dilution of 22:1, naturally-occurring elevated pH values will not cause an exceedance of water quality criteria. Therefore, Kaiser will monitor pH at both the lagoon influent and effluent. Excursions of pH limits at the pond outfall that are shown to be caused by algae only, will not be considered to be permit violations.

Turbidity--The impact of turbidity on the receiving water was not evaluated. Due to the large degree of dilution, the turbidity criteria should not be violated outside the designated mixing zone.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: benzo(a)pyrene, copper, nickel, and zinc. A reasonable potential analysis (See Appendix C) was conducted on these parameters to determine if effluent limitations are required in this permit.

The determination of the reasonable potential for benzo(a)pyrene, copper, nickel, and zinc to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 at the critical condition. The critical condition in this case occurs during Mean Lower Low Water, minimal tidal exchanges, and maximum density stratification. The parameters used in the critical condition modeling were acute dilution factor of nine and chronic dilution factor of twenty-two.

No valid ambient background data was available for benzo(a)pyrene, copper, nickel, and zinc. A determination of reasonable potential using zero for background resulted in no reasonable potential exceedances. The Permittee is required in the draft permit to conduct a receiving water study to collect background concentrations near the point of discharge. This information may result in a permit modification or limits in the next renewal.

Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal. The Permittee may provide data clearly demonstrating the seasonal partitioning of the dissolved metal in the ambient water in relation to an effluent discharge. Metals criteria may be adjusted on a site-specific basis when data is available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Metals criteria may also be adjusted using the water effects ratio approach established by USEPA, as generally guided by the procedures in USEPA Water Quality Standards Handbook, December 1983, as supplemented or replaced.

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sub-lethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC₅₀, EC₅₀, IC₂₅, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center 360-407-7472 for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

Acute Toxicity

As required in the current permit, the Permittee conducted a one year acute WET characterization study that included bimonthly samples and acute bioassay testing in 100% final effluent using three organisms. The three organisms tested were rainbow trout, fathead minnow, and Daphnia pulex.

The following are the results of the acute characterization study:

SAMPLE DATE	RAINBOW TROUT (%) survival in 100% effluent)	FATHEAD MINNOW (% survival in 100% effluent	<u>Daphnia pulex</u> (%) survival in 100% effluent)
01/06/92	100	100	
04/22/92	100	40	100
06/30/92	90	97	100
08/11/92	100	100	100
10/26/92	100	95	100
12/14/92	90	95	90
02/02/93	100	100	80
07/12/93	97		
10/05/93	100		
01/28/94	100		
04/18/94	94		
08/24/94	100		
10/24/94	100		

The criteria to decide if an acute WET limit is required is a median survival of 80% in 100% effluent and no test with a survival of less than 65%. The results for rainbow trout and Daphnia pulex are well above the decision criteria. The results for fathead minnow has a median survival of 97% but one test had a 40% survival. Therefore, a reasonable potential to cause acute conditions in the receiving water has been demonstrated according to chapter 173-205-050(2)(a)(i) WAC. An acute WET limit is required.

Monitoring for compliance with an acute toxicity limit is accomplished by conducting an acute toxicity test using a sample of effluent diluted to equal the ACEC and comparing test organism survival in the ACEC to survival in nontoxic control water. The Permittee is in compliance with the acute toxicity limit if there is no statistically significant difference in test organism survival between the ACEC and the control.

Chronic Toxicity

As required in the current permit, the Permittee conducted a one year chronic WET characterization study that included quarterly samples and chronic bioassay testing using a prescribed definitive dilution series and three species. The three species tested were fathead minnow, Ceriodaphnia dubia and Selenastrum capricornutum. The following are the results of the chronic characterization study:

SAMPLE DATE	FATHEAD MINNOW NOEC (% Effluent)	<u>Selenastrum capricornutum</u> NOEC (% Effluent)	<u>Ceriodaphnia dubia</u> NOEC (% Effluent)
10/26/92	>12.5	100	6.25
02/02/93	50	100	25
05/24/93	100	100	100
07/12/93	100	100	12.5

The criteria for determining if a chronic WET limit is required is a statistically significant difference in response between the control and the ACEC. The ACEC for this discharge is 10%. The fathead minnow and Selenastrum capricornutum results pass the decision criteria but the Ceriodaphnia dubia had one out of the four tests with a response below 10% (NOEC of 6.25% on 10/26/92) which fails to meet the decision criteria. A reasonable potential to cause chronic conditions in the receiving water has been demonstrated according to chapter 173-205-050(2)(a)(ii) WAC and, therefore, a chronic limit is required.

The effluent limit for chronic toxicity is no statistically significant difference in response between the control and the test concentration representing the chronic critical effluent concentration (CCEC).

The CCEC is the maximum concentration of effluent allowable at the boundary of the mixing zone to WAC 173-201A-100. The CCEC for this discharge is 4.3% effluent.

Biannual monitoring using fathead minnow and Ceriodaphnia dubia on a rotating basis will be required to determine compliance with the effluent limit. The chronic toxicity compliance testing will be performed using two dilutions, 4.3% (the CCEC) and 10% (the ACEC), and a control. The Permittee is in compliance with the chronic toxicity limit if there is no statistically significant difference in test organism response between the CCEC and the control.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the effluent is likely to have chemicals of concern for human health. The discharger's high priority status is based on knowledge of data and process information indicating regulated chemicals occur in the discharge.

A determination of the discharge's potential to cause an exceedance of the water quality standards was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and the Department's Permit Writer's Manual (Ecology Publication 92-109, July, 1994). The determination indicated that the discharge has no reasonable potential to cause a violation of water quality standards- except for arsenic- thus no effluent limits are warranted. Ecology and EPA are currently evaluating arsenic-related issues, including criterion levels. At this time, an option has not been agreed upon. If necessary, Kaiser's permit will be re-opened and modified if arsenic limits or monitoring is needed.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge currently has no reasonable potential to violate the Sediment Management Standards. In addition, a sediment cleanup is underway in the Hylebos Waterway, including the area of potential impact by Kaiser's present and past outfall locations.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect beneficial uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no known direct discharge to ground and therefore no limitations are required based on potential effects to ground water.

COMPARISON OF PROPOSED EFFLUENT LIMITS WITH THE EXISTING PERMIT

Current versus proposed effluent limits and monitoring frequencies at Outfall 001 are compared in the tables below:

Outfall 001	<i>Existing Limits</i>		<i>Proposed Limits</i>	
Parameter:	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.
TSS	160.0 lb/day	320.0 lb/day	90 lb/day	250 lb/day
Fluoride	80.0 lb/day	240.0 lb/day	52 lb/day	170 lb/day
Aluminum	25.0 lb/day	50.0 lb/day	10 lb/day	50 lb/day
Cyanide, free	-	0.01 mg/L	-	0.01 mg/L
Benzo(a)pyrene	-	0.01 mg/L	-	0.01 mg/L
Oil and Grease	-	10 mg/L	5 mg/L	10 mg/L
PCB's	-	0.003 mg/L		0.003 mg/L
Nickel	-	0.01 mg/L	none	none
pH	Min. 6.0	Max. 9.0	Min. 6.0	Max. 9.0

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule details are in the proposed permit under Condition S.2. Specified monitoring frequencies account for the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

Existing versus proposed monitoring frequencies are shown in the table below. The proposed frequencies were determined as per the Monitoring Guidelines, Section XIII in Ecology's Permit Writer's Manual. Based on this evaluation, proposed frequencies are higher for cyanide, B(a)p, and PCB's. Nickel and copper are no longer proposed for monitoring because no limits are proposed for them, because they are trace contaminants only, they exist at levels far below treatable concentrations, and pose no threat to water quality. See *Toxic Pollutants* section of *Consideration of Surface Water Quality-Based Limits for Numeric Criteria*, page 12 of this fact sheet.

Outfall 001	Monitoring Frequency:	
Parameter:	Existing	Proposed
TSS	Daily	Daily
Fluoride	Daily	Daily
Aluminum	Daily	Daily
Cyanide, free	Weekly	Daily
Benzo(a)pyrene	Weekly	Daily
Oil and Grease	Daily	Daily
PCB's	Quarterly	Weekly
Nickel	Weekly	None
Copper	Weekly	None
pH	Continuous	Continuous
Temperature	Continuous	Continuous
Flow	Continuous	Continuous
Precipitation	Daily	Daily
WET Testing	None	Biannual

OTHER PERMIT CONDITIONS

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. Kaiser Tacoma's laboratory is accredited for: fluoride, oil & grease, pH, and total suspended solids. Accreditation for fluoride is provisional. Accredited commercial laboratories perform all additional analyses.

REPORTING AND RECORDKEEPING

The conditions of S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 273-220-210).

SPILL PLAN

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

The Permittee has developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the Permittee to update this plan and submit it to the Department.

OUTFALL EVALUATION

Proposed permit Special Condition S.10 requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to evaluate the extent of sediment accumulations in the vicinity of the outfall.

TREATMENT SYSTEM OPERATING PLAN

In accordance with state and federal regulations, the Permittee is required to take all reasonable steps to properly operate and maintain the treatment system (40 CFR 122.41(e)) and WAC 173-220-150 (1)(g). An operation and maintenance manual was submitted as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). It has been determined that the implementation of the procedures in the Treatment System Operating Plan is a reasonable measure to ensure compliance with the terms and limitations in the permit.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual industrial NPDES permits issued by the Department.

Condition G1 requires responsible officials or their designated representatives to sign submittals to the Department. Condition G2 requires the Permittee to allow the Department to access the treatment system, production facility, and records related to the permit. Condition G3 specifies conditions for modifying, suspending or terminating the permit. Condition G4 requires the Permittee to apply to the Department prior to increasing or varying the discharge from the levels stated in the permit application. Condition G5 requires the Permittee to construct, modify, and operate the permitted facility in accordance with approved engineering documents. Condition G6 prohibits the Permittee from using the permit as a basis for violating any laws, statutes or regulations. Conditions G7 and G8 relate to permit renewal and transfer. Condition G9 requires the Permittee to control its production in order to maintain compliance with its permit. Condition G10 prohibits the reintroduction of removed substances back into the effluent. Condition G11 states that the Department will modify or revoke and reissue the permit to conform to more stringent toxic effluent standards or prohibitions. Condition G12 incorporates by reference all other requirements of 40 CFR 122.41 and 122.42. Condition G13 notifies the Permittee that additional monitoring requirements may be established by the Department. Condition G14 requires the payment of permit fees. Condition G15 describes the penalties for violating permit conditions.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards for Surface Waters, Sediment Quality Standards, or Water Quality Standards for Ground Waters, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies. In particular, if Kaiser rebuilds or modifies their outfall 001 treatment system, limits may have to be changed until sufficient data can be collected to set new limits based on actual performance, usually at least two years. The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this proposed permit be issued for **5** years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Parametrix, Inc. Kaiser Aluminum & Chemical Corporation Dilution Ratio Study. PMX # 21-1510-04, February 1993.

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations as described in this fact sheet.

Public notice of application was published in September 1996 in the Tacoma News Tribune to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on November 15, 1999 in Tacoma's The News Tribune to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 4:30 p.m. weekdays, at the Permit Assistance Center at Department of Ecology, 300 Desmond Drive in Lacey, Washington. Written comments should be mailed to:

Don Reif, Permit Manager
Department of Ecology, Industrial Section
P.O. Box 47706
Olympia, WA 98504-7706

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 360-407-6945 or by writing to the address listed above.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AKART-- An acronym for “all known, available, and reasonable methods of treatment”.

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Mixing Zone--An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel[®] spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.wa.gov/ecology>.

APPENDIX D--RESPONSE TO COMMENTS